Besides its location in Investment Level 4, DNREC's concerns with this project include:

- Its location in a TMDL high reduction zone within the Inland Bays Watershed, which is now regulated by an enforceable Pollution Control Strategy;
- An apparent underestimation of impervious cover; and
- The observation that tax ditch rights-of-way shown on the preliminary site plan do not correspond with the existing tax ditch rights-of-way.

See comments below for more information.

Investment Level 4 Policy Statement

This project is proposed for an Investment Level 4 area as defined by the *Strategies for State Policies and Spending* and is also located outside of a designated growth area in the relevant municipal and County certified comprehensive plans. According to the *Strategies*, this project is inappropriate in this location. In Investment Level 4 areas, the State's investments and policies, from DNREC's perspective, should retain the rural landscape and preserve open spaces and farmlands. Open space investments should emphasize the protection of critical natural habitat and wildlife to support a diversity of species, and the protection of present and future water supplies. Open space investments should also provide for recreational activities, while helping to define growth areas. Additional State investments in water and wastewater systems should be limited to existing or imminent public health, safety or environmental risks only, with little provision for additional capacity to accommodate further development.

With continued development in Investment Level 4 areas, the State will have a difficult, if not impossible, time attaining water quality (e.g., TMDLs) and air quality (e.g., non-attainment areas for ozone and fine particulates) goals. Present and future investments in green infrastructure, as defined in Governor Minner's Executive Order No. 61, will be threatened. DNREC strongly supports new development in and around existing towns and municipalities and in areas designated as growth zones in certified Comprehensive Plans. We encourage the use of transfer of development rights where this growth management tool is available.

This particular development certainly compromises the integrity of the State Strategies and the preservation goals inherent in many of DNREC's programs. In addition, if a new public well is installed onsite, a wellhead protection area must be established in accordance with Sussex County regulations. While mitigating measures such as conservation design, central wastewater systems instead of individual on-site septic systems, and other best management practices may help mitigate impacts from this project, not doing the project at all is the best avenue for avoiding negative impacts. As such, this project will receive no financial, technical or other support of any kind from DNREC. Any required permits or other authorizations for this project shall be considered in light of the project's conflict with our State growth strategies.

Soils

Based on the NRCS soil survey update, Pepperbox-Rosedale complex (PsA) was mapped in the immediate vicinity of the proposed construction. Pepperbox-Rosedale complex is a moderately well to well-drained soil found on the lower portions of the upland landscape.

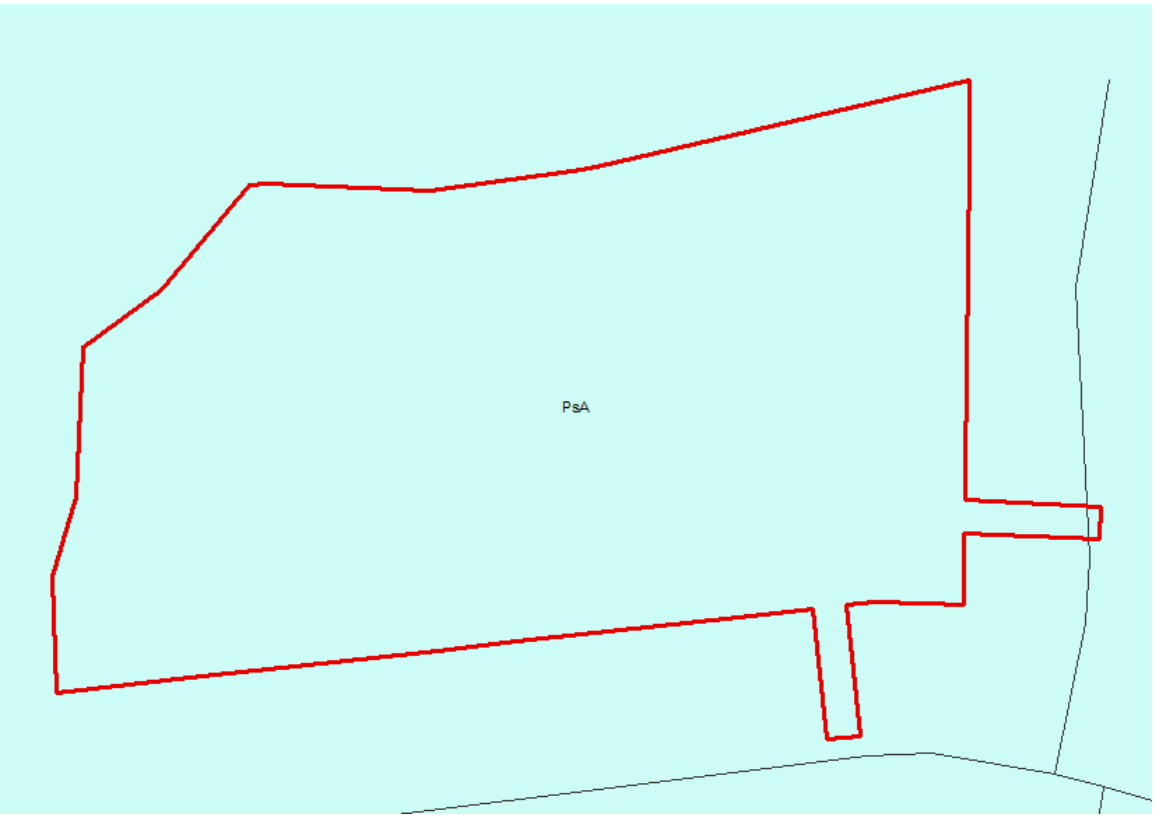

Figure 1: NRCS soil survey update mapping in the immediate vicinity of the proposed Wilde Woods subdivision.

Wetlands

Based on the Statewide Wetland Mapping Project (SWMP) maps, palustrine forested wetlands (PF01A) and palustrine emergent wetlands were mapped along the northern and western boundaries of the area proposed for construction (See figure 2). It is also likely that some unmapped wetlands may also be found on other portions of this parcel as well.

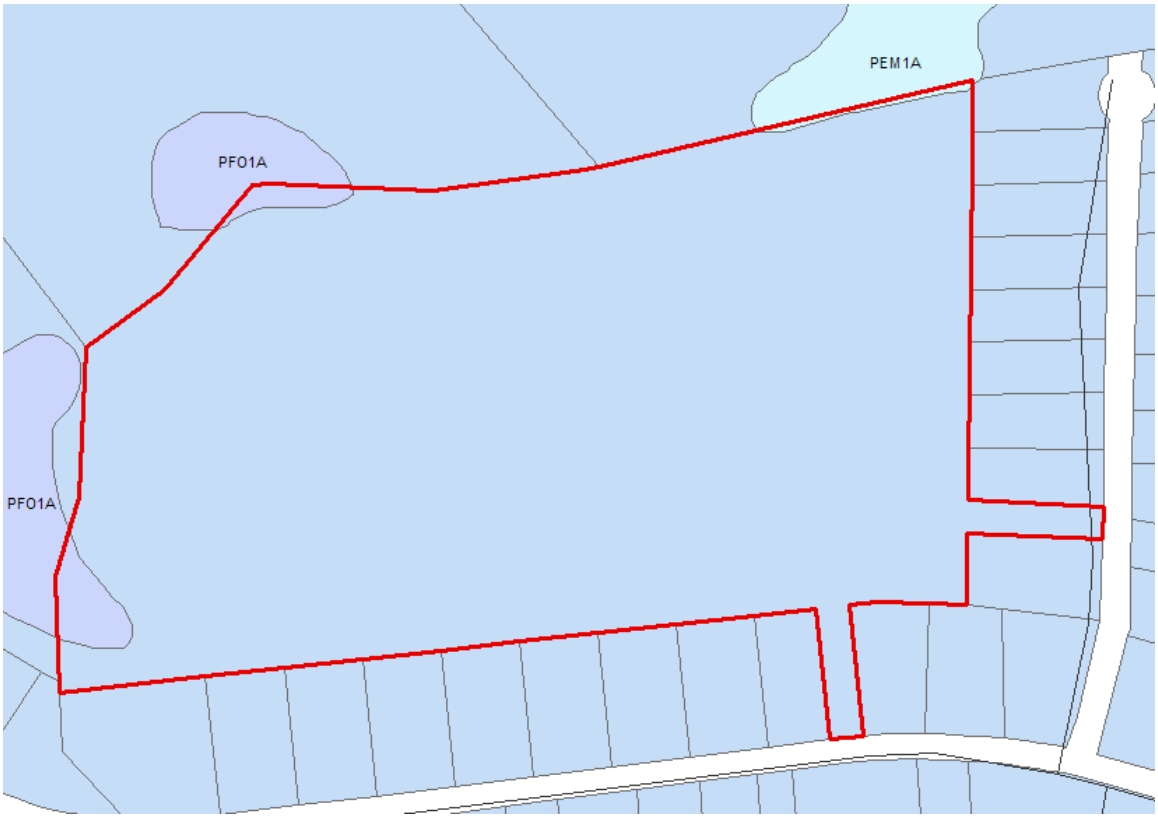

Figure 2: SWMP mapping in the immediate vicinity of the proposed Wilde Woods subdivision.

The applicant is responsible for determining whether any State-regulated wetlands (regulated pursuant to 7 Del.C. Chapter 66 and the Wetlands Regulations) are present on the property. This determination can only be made by contacting the Division of Water Resources' Wetlands and Subaqueous Lands Section at 302/739-9943 and consulting the State's official wetland regulatory maps, which depict the extent of State jurisdiction. The area regulated by State law may be very different from the area under federal authority. No activity may take place in State-regulated wetlands without a permit from DNREC's Wetlands Section.

In addition, most perennial streams and ditches and many intermittent streams and ditches are regulated pursuant to the Subaqueous Lands Act (7 Del.C. Chapter 72) and the Regulations Governing the Use of Subaqueous Lands. Ponds which are connected to other waters are also regulated, while isolated ponds are not. Any work in regulated streams, ditches or ponds requires a permit from the Wetlands and Subaqueous Lands Section. An on-site jurisdictional determination is recommended in order to determine whether any regulated watercourses exist on the property. Since a tax ditch(s) is present on this parcel (L& T tax ditch), State-regulated wetlands are likely on this parcel. Please contact the Wetlands and Subaqueous Lands Section at 302/739-9943 to schedule an on-site visit**.** Such appointments can usually be scheduled within 2 to 3 weeks.

The applicant should also be reminded that they must avoid construction/filling activities in those areas containing wetlands or wetland associated hydric soils as they are subject to regulatory jurisdiction under Federal 404 provisions of the Clean Water Act. A site-specific field wetlands delineation using the methodology described in the 1987 United States Army Corps of Engineers (USACE, or "the Corps") manual is the acceptable basis for making a jurisdictional wetland determination for nontidal wetlands in Delaware. The applicant is forewarned that the Corps views the use of the National Wetlands Inventory (NWI) mapping or the Statewide Wetlands Mapping Project (SWMP) mapping as an unacceptable substitute for making such delineations. To ensure compliance with said Corps regulatory requirements, it is strongly recommended that a field wetlands delineation using the above-referenced methodology be performed on this parcel before commencing any construction activities. It is further recommended that the Corps be given the opportunity to officially approve the completed delineation. In circumstances where the applicant or applicant's consultant delineates what they believe are nonjurisdictional isolated (SWANCC) wetlands, the Corps must be contacted to evaluate and assess the jurisdictional validity of such a delineation. The final jurisdictional authority for making isolated wetlands determinations rests with the Corps; they can be reached by phone at 736-9763.

Based on a review of existing buffer research by Castelle et al. (Castelle, A. J., A. W. Johnson and C. Conolly. 1994. *Wetland and Stream Buffer Requirements – A Review.* J. Environ. Qual. 23: 878-882), an adequately-sized buffer that effectively protects wetlands and streams, in most circumstances, is about 100 feet in width. In recognition of this research and the need to protect water quality, the Watershed Assessment Section recommends that the applicant maintain/establish a minimum 100-foot upland buffer (planted in native vegetation) from all water bodies (including ditches) and wetlands.

Impervious Cover

The applicant estimates this project's post-construction surface imperviousness to reach only 17 percent. However, given the scope and density of this project (i.e., as viewed from the conceptual project layout) this estimate appears to be a significant underestimate. Using the TR-55 methodology and applying it to the project's average lot size of about 0.2 acres, impervious cover is roughly calculated to be in the neighborhood of 40-50%. When calculating surface imperviousness, it is important to include all forms of constructed surface imperviousness, such as: all paved surfaces including rooftops, sidewalks, driveways, and roads; open-water stormwater management structures and/or ponds; and community wastewater systems. Failure to do so will significantly understate this project's true environmental impacts. Therefore, surface imperviousness should be recalculated to reflect all of the above-mentioned forms of surface imperviousness in the finalized calculation for surface imperviousness. **Note:** wetlands should be excluded from the parcel's total open space area when calculating the parcel's total surface imperviousness.

Studies have shown a strong relationship between increases in impervious cover to decreases in a watershed's overall water quality. It is strongly recommended that the applicant implement best management practices (BMPs) that reduce or mitigate some of this project's most likely adverse impacts. Reducing the amount of surface imperviousness through the use of pervious paving materials ("pervious pavers") in lieu of asphalt or concrete in conjunction with an increase in forest cover preservation or additional tree plantings are some examples of practical BMPs that could easily be implemented to help reduce surface imperviousness.

ERES Waters

This project is located adjacent to receiving waters of the Inland Bays designated as waters having Exceptional Recreational or Ecological Significance (ERES). ERES waters are recognized as special assets of the State, and shall be protected and/ or restored, to the maximum extent practicable, to their natural condition. Provisions in Section 5.6 of Delaware's "Surface Water Quality Standards" (as amended July 11, 2004), specify that all designated ERES waters and receiving tributaries develop a "pollution control strategy" to reduce non-point sources of pollutants through implementation of Best Management Practices (BMPs). Best Management Practices as defined in subsection 5.6.3.5 of this section, expressly authorizes the Department to provide standards for controlling the addition of pollutants and reducing them to the greatest degree achievable and, where practicable, implementation of a standard requiring no discharge of pollutants.

TMDLs

Total Maximum Daily Loads (TMDLs) for nitrogen and phosphorus have been promulgated through regulation for the Inland Bays Watershed. A TMDL is the maximum level of pollution allowed for a given pollutant below which a "water quality limited water body" can assimilate and still meet water quality standards to the extent necessary to support use goals such as, swimming, fishing, drinking water and shell fish harvesting. Although TMDLs are required by federal law, states are charged with developing and implementing standards to support these desired use goals. This project is located in the high nutrient reduction area requiring an 85 and 65 percent reduction in nitrogen and phosphorus, respectively. Additionally, a 40 percent reduction in bacteria is also required.

Compliance with TMDLs through the PCS

As stated above, TMDLs for nitrogen and phosphorus have been promulgated through regulation for the Inland Bays Watershed. The TMDL calls for an 85 percent reduction in nitrogen and phosphorus from baseline conditions. Additionally, a 40 percent reduction in bacteria will also be required from baseline conditions Additional nutrient reductions may be possible through the implementation of best management practices (BMPs) such as wider vegetated buffers along watercourses (and wetlands), increasing passive, wooded open space, use of pervious paving materials to reduce surface imperviousness (i.e., pervious pavers), connection to a central sewer

(or a performance-based community wastewater system), and the use of green-technology stormwater management technologies.

A Pollution Control Strategy (PCS) is an implementation strategy that identifies the actions necessary to systematically reduce the pollutant loading rate for a given water body and meet the TMDL reduction requirements specified for that water body. As mentioned previously, the pollutants specifically targeted for reduction in the Inland Bays watershed are nutrients (e.g., nitrogen and phosphorus) and bacteria. A variety of site-specific BMPs will be the primary actions required by the PCS to reduce nutrient and bacterial pollutant loadings. The PCS for the Inland Bays was approved on November 11, 2008, and is now an enforceable regulatory directive.

The Department has developed an assessment tool that will help evaluate whether your proposed development meets the required TMDL nutrient reduction requirements specified by the PCS. Contact Lyle Jones at 302-739-9939 for more information on the assessment tool.

Water Supply

The information provided indicates that Tidewater Utilities will provide well water to the proposed project(s) through a public water system. Our files reflect that Tidewater Utilities does not currently hold a Certificate of Public Convenience and Necessity (CPCN) to provide public water in these areas. They will need to file an application for a CPCN with the Public Service Commission, if they have not done so already. Information on CPCN requirements and applications can be obtained by contacting the Public Service Commission at 302-736-7547. Since an on-site public well will be needed, a minimum isolation distance of 150 feet is required between the well and any potential source of contamination, such as a septic tank and sewage disposal area, furthermore, it must be located at least 150 feet from the outermost boundaries of the project. The Division of Water Resources will consider applications for the construction of on-site wells provided the wells can be constructed and located in compliance with all requirements of the Regulations Governing the Construction and Use of Wells. A well construction permit must be obtained prior to constructing any wells.

Should dewatering points be needed during any phase of construction, a dewatering well construction permit must be obtained from the Water Supply Section prior to construction of the well points. In addition, a water allocation permit will be needed if the pumping rate will exceed 50,000 gallons per day at any time during operation.

All well permit applications must be prepared and signed by licensed water well contractors, and only licensed well drillers may construct the wells. Please factor in the necessary time for processing the well permit applications into the construction schedule. Dewatering well permit applications typically take approximately four weeks to process, which allows the necessary time for technical review and advertising.

Should you have any questions concerning these comments, please contact Rick Rios at 302-739-9944.

Sediment and Stormwater

- A detailed sediment and stormwater plan will be required prior to any land disturbing activity taking place on the site. Contact the reviewing agency to schedule a pre-application meeting to discuss the sediment and erosion control and stormwater management components of the plan as soon as practicable. The site topography, soils mapping, pre- and post-development runoff, and proposed method(s) and location(s) of stormwater management should be brought to the meeting for discussion. The plan review and approval as well as construction inspection will be coordinated through the Sussex Conservation District. Contact Jessica Watson at the Sussex Conservation District at (302) 856-2105 for details regarding submittal requirements and fees.

- Because of the parcel's location in an impaired watershed and the amount of impervious surface, green technology BMPs and low impact development practices should be considered a priority to reduce stormwater flow and to meet water quality goals. The Sediment and Stormwater Management Program ensures sediment and erosion control plans and stormwater plans comply with local land use ordinances and policies, including the siting of stormwater management facilities. However, we do not support placement in resource protection areas or the removal of trees for the sole purpose of placement of a stormwater management facility/practice.

- Include Brooks Cahall, of the Drainage Program, in the pre-application meeting with the Sussex Conservation District to discuss drainage, stormwater management, tax ditch maintenance, and the release of stormwater into the tax ditch. Show the location and width of tax ditch rights-of-way on the sediment and stormwater plans.

Drainage

- This project is located within the L & T Tax Ditch. The tax ditch rights-of-way shown on the preliminary site plan do not correspond with the existing tax ditch rights-of-way. Any change to the location of the tax ditch or existing tax ditch rights-of-way will require a change to the L & T Tax Ditch court order. The placement of permanent obstructions within tax ditch rights-of-way is prohibited. Please contact Brooks Cahall of the Drainage Program in Georgetown at (302) 855-1930 as soon as possible to discuss the tax ditch rights-of-way for this project. It is suggested to include Brooks Cahall in the pre-application meeting with the Sussex Conservation District to discuss drainage, stormwater management, tax ditch maintenance, and the release of stormwater into the tax ditch.

- The Drainage Program requests that the engineer take precautions to ensure the project does not hinder any off site drainage upstream of the project or create any off site drainage problems downstream by the release of onsite storm water. The Drainage Program requests that

the engineer check existing downstream ditches and pipes for function and blockages prior to the construction. Notify downstream landowners of the change in volume of water released on them.

- Have all drainage easements recorded on deeds and place restrictions on obstructions within the easements to ensure access for periodic maintenance or future re-construction. Future property owners may not be aware of a drainage easement on their property if the easement is only on the record plan. However, by recording the drainage easement on the deed, the second owner, and any subsequent owner of the property, will be fully aware of the drainage easement on their property.

- Excessive tree removal contributes to drainage problems and requires additional stormwater management measures. Where practical, plant native trees and shrubs to compensate for the loss of nutrient uptake and stormwater absorption the removed trees provided.

Site Visit

The Division of Fish and Wildlife's community ecologist, Robert Coxe, conducted a vegetative community survey at this project site on September 24, 2008. A summary of Robert's findings is included below. He did not note any rare community types on this site. Please note that this report constitutes a vegetative community survey only. Surveys for specific rare plant and rare animal species were not conducted, however, at this time there are no further requests from our program for additional surveys.

Three natural vegetation communities were noted. The National Vegetation Classification (NVC) Association number is given with the vegetation community and their approximate acreage in the project area. Names of communities correspond with the common names as given in the NVC.

Red Maple-Sweetgum Swamp (5.6 acres)

This community, located at the west end of the site near the ditch for the small tributary to Swan Creek, has a medium age canopy dominated by red maple (Acer rubrum) and associated by black gum (Nyssa sylvatica), sweetgum (Liquidambar styraciflua), wild black cherry (Prunus serotina), water oak (Quercus nigra) and black gum (Nyssa sylvatica). Smaller members of the canopy plus a few willow oak (Quercus phellos) and sassafras (Sassafras albidum) make up the canopy. Common greenbrier (Smilax rotundifolia) is common in places in the vine layer. Few, if any, herbs were seen in this community. Woody debris and snags are small and scattered with this community.

Southern Red Oak/Heath Forest (15.1 acres)

A fair successional (medium age) example of a Southern Red Oak/Heath Forest covers most of the site. Species in the low canopy include southern red oak (Quercus falcata), northern red oak

(Quercus rubra), white oak (Quercus alba), mockernut hickory (Carya tomentosa) and scattered red maple (Acer rubrum) and blackjack oak (Quercus marilandica). The understory is composed of smaller members of the canopy plus devil's walking stick (Aralia spinosa), American holly (Ilex opaca), sassafras (Sassafras albidum) and a few eastern red cedar (Juniperus virginiana). The shrub layer has occasional dense patches of low bush blueberry (Vaccinium pallidum) and huckleberry (Gaylussacia frondosa) that are likely remnants of the previous forest before cutting. Other shrubs include inkberry (Ilex glabra) and dense patches of common greenbrier (Smilax rotundifolia). The few herbs seen include wintergreen (Gaultheria procumbens), indian pipes (Monotropa uniflora) and bracken fern (Pteridium aquilinium).

Successional Sweetgum Forest (0.7 acres)

A poor example of a Successional Sweetgum Forest covers a ditch draining a small tributary to Swan Creek. The ditch area is covered by a low dense canopy of sweetgum (Liquidambar styraciflua) with inkberry (Ilex glabra), low bush blueberry (Vaccinium pallidum) and American holly (Ilex opaca) making up the small "understory." Hay-scented fern (Dennsteadtia punctilobula) and deer-tongue grass (Dichanthelium clandestinum) compose the dense herbaceous layer.

Wildlife Habitat Loss

Cumulative wildlife habitat loss throughout the State is of utmost concern to the Division of Fish and Wildlife which is responsible for conserving and managing the State's wildlife (see www.fw.delaware.gov and the Delaware Code, Title 7). Because of an overall lack of habitat protection, we have to rely on applicants and/or the entity that approves the project (i.e. counties and municipalities) to consider implementing measures that will aide in habitat loss reduction.

This project proposes the removal and/or fragmentation of forest (15 out of 22 acres or 68%). Although leaving a forest intact is usually more beneficial to the existing wildlife and is preferential to clearing, we offer the following recommendations which if implemented will reduce impacts to natural resources.

1) This site is entirely forested, so the optimal way to reduce forest loss would be to consider preservation or downsize the project. If preservation is an option, there are incentive-based programs for wildlife management available to private landowners, some of which are through our agency. Shelly Tovell of the Landowner Incentive Program can be contacted at (302) 735-3600 if the landowner(s) is interested in more information.

2) To reduce impacts to nesting birds and other wildlife species that utilize forests for breeding, we recommend that clearing not occur April 1st to July 31st. This clearing recommendation would only protect those species during one breeding season; once trees are cleared the result is an overall loss of habitat.

3) Explore green technologies and alternatives to clearing trees for stormwater management.

Nuisance Waterfowl

Wet ponds created for stormwater management purposes may attract resident Canada geese and mute swans that will create a nuisance for community residents. High concentrations of waterfowl in ponds create water-quality problems, leave droppings on lawn and paved areas and can become aggressive during the nesting season. Short manicured lawns around ponds provide an attractive habitat for these species. We recommend native plantings, including tall grasses, wildflowers, shrubs, and trees at the edge and within an adequate buffer (15-30 feet in width) around the ponds (planted in accordance with the Sediment and Stormwater Plan approval agency requirements). When the view of the surrounding area from the pond is blocked, geese can't scan for predators and are less likely to reside and nest in the area of the pond.

At this time, we do not recommend using monofilament grids due to the potential for birds and other wildlife to become entangled if the grids are not properly installed and maintained. In addition, the on-going maintenance (removing entangled trash, etc.) may become a burden to the homeowners association or land manager.

The Division of Fish and Wildlife does not provide goose control services, and if problems arise, residents or the home-owners association will have to accept the burden of dealing with these species (e.g., permit applications, costs, securing services of certified wildlife professionals). Solutions can be costly and labor intensive; however, with a reduction in the number of ponds, proper landscaping, monitoring, and other techniques, geese problems can be minimized.

Air Quality

Housing developments may unnecessarily emit, or cause to be emitted, significant amounts of air contaminants into Delaware's air, which will negatively impact public health, safety and welfare. These negative impacts are attributable to:

- Emissions that form ozone and fine particulate matter; two pollutants relative to which Delaware currently violates federal health-based air quality standards,
- The emission of greenhouse gases which are associated with climate change, and
- The emission of air toxics.

Air emissions generated from housing developments include emissions from:

- Area sources like painting, lawn and garden equipment and the use of consumer products like roof coatings and roof primers.
- The generation of electricity needed to support the homes in your development, and
- Car and truck activity associated with the homes in your new development.

These three air emissions components (i.e., area, electric power generation, and mobile sources) are quantified below, based on a per household/residential unit emission factor that was developed using 2002 Delaware data. These emissions in the table represent the actual impact the Wilde Woods development may have.

Emissions Attributable to Wilde Woods Subdivision (Tons per Year)

	Volatile Organic Compounds (VOC)	Nitrogen Oxides (NOx)	Sulfur Dioxide (SO_2)	Fine Particulate Matter ($PM_{2.5}$)	Carbon Dioxide (CO_2)
Direct Residential	1.1	0.1	0.1	0.1	4.6
Electrical Power Generation	ND*	0.5	1.6	ND*	232.9
Mobile	16.6	13.7	1.7	0.2	237.5
Total	17.7	14.3	3.4	0.3	475.0

(*) *Indicates data is not available.*

Note that emissions associated with the actual construction of the subdivision, including automobile and truck traffic from working in, or delivering products to the site, as well as site preparation, earth moving activities, road paving and other miscellaneous air emissions, are not reflected in the table above.

Recommendations:

The applicant shall comply with all applicable Delaware air quality regulations. These regulations include:

Regulation 6 - Particulate Emissions from Construction and Materials Handling	• **Using dust suppressants and measures to prevent transport of dust off-site from material stockpile, material movement and use of unpaved roads.** • **Using covers on trucks that transport material to and from site to prevent visible emissions**.
Regulation 1113 – Open Burning	• **Prohibiting open burns statewide during the Ozone Season from May 1-Sept. 30 each year.** • **Prohibiting the burning of land clearing debris.** • **Prohibiting the burning of trash or building materials/debris.**
Regulation 1145 – Excessive Idling of Heavy Duty Vehicles	• **Restricting idling time for trucks and buses having a gross vehicle weight of over 8,500 pounds to no more than three minutes.**

Additional measures may be taken to substantially reduce the air emissions identified above. These measures include:

- **Constructing only energy efficient homes.** Energy Star qualified homes are up to 30% more energy efficient than typical homes. These savings come from building envelope upgrades, high performance windows, controlled air infiltration, upgraded heating and air conditioning systems, tight duct systems and upgraded water-heating equipment. Every percentage of increased energy efficiency translates into a percent reduction in pollution. The Energy Star Program is excellent way to save on energy costs and reduce air pollution.

- **Offering geothermal and/or photo voltaic energy options.** These systems can significantly reduce emissions from electrical generation, and from the use of oil or gas heating equipment.

- **Providing tie-ins to the nearest bike paths and links to any nearby mass transport system**. These measures can significantly reduce mobile source emissions.

- **Funding a lawnmower exchange program**. New lawn and garden equipment emits significantly less than equipment as little as 7 years old, and may significantly reduce emissions from this new development. The builder could fund such a program for the new occupants.

Additionally, the following measures will reduce emissions associated with the actual construction phase of the development:

- **Using retrofitted diesel engines during construction**. This includes equipment that are on-site as well as equipment used to transport materials to and from site.

- **Using pre-painted/pre-coated flooring, cabinets, fencing, etc**. These measures can significantly reduce the emission of VOCs from typical architectural coating operations.

- **Planting trees at residential units and in vegetative buffer areas**. Trees reduce emissions by trapping dust particles and by replenishing oxygen. Trees also reduce energy emissions by cooling during the summer and by providing wind breaks in the winter, whereby reducing air conditioning needs by up to 30 percent and saving 20 to 50 percent on fuel costs.

This is a partial list, and there are additional things that can be done to reduce the impact of the development on air quality. The applicant should submit a plan to the DNREC Air Quality Management Section which address the above listed measures, and that details all of the specific emission mitigation measures that will be incorporated into the Wilde Woods development. Air Quality Management Section points of contact are Phil Wheeler and Deanna Morozowich, and they may be reached at (302) 739-9402.